



Submarine Systems Engineering (SSE) services portfolio

Design, delivery and operations of global
submarine systems

enterprise.vodafone.co.uk/sse

power to you

Vodafone Submarine Systems Engineering (SSE)

Excellence in global submarine systems design, delivery and operations.

Vodafone's SSE division is a world-leading specialist team with experience in all aspects of submarine systems engineering, encompassing: project initiation, system design, project development, contract management and operations. SSE has a proven track-record in the management of submarine cable projects spanning more than 35 years.

Deep experience

SSE provides industry-leading consultancy services to deliver submarine systems that meet our customers' current and future business needs. We can specify, support, operate, and maintain submarine systems, helping clients to optimise their investment, minimise risk and achieve a high level of performance.

Our team has vast experience, skills and engineering knowledge gained over a lifetime and a proven record of achievement working in a multi-vendor environment. We have pioneered engineering solutions that integrate multi-vendor sourced elements as well as the recovery and redeployment of decommissioned systems.

SSE is an active participant in many global submarine cable forums and regularly presents papers at SubOptic.

Cutting-edge expertise

Drawing on our current experience and the contract negotiations we regularly undertake, we can provide expert support to any planned new submarine cable system, based on the most up-to-date technological and commercial standards available from suppliers across the industry. We will help minimise risk and maximise value from the project, by providing advice and support relating to any and all aspects of a submarine cable installation and the related activities.

SSE's consultancy services are backed up by our detailed knowledge of the submarine system market. As an owner and purchaser of submarine systems, we are able keep up to date with engineering capabilities, market changes and industry best practice. This enables us to tailor services to each client's requirements. We have 35 years' experience of engineering our international network to the highest standards.

We offer our clients the reassurance that their system will be engineered to the same exacting standards.



Vodafone has a track record of successfully negotiating large and small system contracts on behalf of ourselves and our clients, adding value and engineering expertise as a matter of course.

Market awareness

SSE maintains relationships with cable manufacturers, technology providers and installers around the world. In addition, we have first hand knowledge of operating and managing our own submarine cable portfolio.

These relationships keep us in regular contact with the engineering capabilities of suppliers, changes in market conditions and industry best practice. This enables us to understand the market better and know which suppliers are best qualified to provide the most cost-effective services. We analyse patterns, trends and abilities and use these to the best advantage of our customers.

Negotiation skills

Successful negotiations can provide significant reductions in construction costs and provide confidence that the correct design, specification, installation and techniques are being integrated into construction contracts to ensure systems are delivered on time and within budget.

All of these factors create confidence in the design of the system and will reduce long-term operating and maintenance costs over its life. SSE has a proven track record of successfully negotiating large and small contracts on behalf of Vodafone and our clients.

Tender analysis and contract negotiation

By collating market intelligence and practical information, SSE can develop bespoke specifications and tender documentation and is experienced in tender evaluation, supplier negotiation and selection. SSE can support ongoing activities by validating requirements and evaluating responses.

System design

Drawing on our many years of technological innovation and practical experience enables SSE to define engineering solutions that offer the best fit for our customers' needs. Our familiarity with industry best practice and the technologies enables us to identify the solutions that will most competitively and effectively meet those needs.

Our services are designed to support every aspect of a project through all phases, from inception to Ready For Service and into operation and maintenance. Indeed, we are able to offer any combination of these project aspects, from design authority to system operator, to meet customers' requirements. Solutions developed and offered by SSE will add value to your project.



Consultancy and design services

Every successful project starts with a sound understanding of requirements and clear planning.

1

➤ Feasibility studies

➤ Business case preparation and analysis

- Initial data gathering to obtain information about the interest of other owners for potential new systems and system upgrades.
- Strategic planning and development proposals (including upgrades) for international submarine networks, based on the capacity forecasts and cost targets provided by the customer.
- Commercial guidance and support for the wholesale procurement and sale of international capacity, either IRU or lease as may be requested by the customer.
- Analysis of capacity requirements based on capacity forecast provided by the customer (and other operators where applicable).
- System technical description and costing for the business case.
- Analysis of project risks and dependencies.

➤ Preliminary system design (pre-contract)

- Preliminary route engineering.
- System design.
- System security considerations and solutions.
- Cost estimations.
- Assessment of project requirements, products and suppliers.



Development and acquisition services

Designing and specifying the system itself demands detailed insight into routes, technologies and suppliers.

2

➤ System specification

- Reviewing of key system design criteria.
- Designing system architecture.
- Writing technical specifications.
 - System design.
 - Network.
 - Cable.
 - Repeater.
 - PFE.
 - SLTE.
 - BU.
 - Facilities.
 - QA.
- Conducting design reviews with system suppliers.

➤ Preliminary system design (pre-contract)

- Preliminary route engineering.
- System design.
- System security considerations and solutions.
- Cost estimations.
- Assessment of project requirements, products and suppliers.

➤ Tender preparation

➤ Tender evaluation



Implementation and integration services

We pioneered many of the project management methodologies in use in the submarine industry today and continue to innovate.

3

➤ Cable route study

➤ Supplier audit

➤ Terminal site survey

➤ Marine survey administration

➤ Project management

The project management service from SSE involves the supply of a project manager and project support office (as appropriate) to undertake full project management of any or all aspects of the following:

- Preparation of project plan.
- Preparation and maintenance of project plan and budget.
- Project assurance.
- Risk management.
- Quality management.
- Change control.
- Co-ordination of all resources required to fulfil the scope of work.
- Assessment of potential problem areas and development of work-around plans.
- Regular and detailed reporting to project board.
- Monitoring of supplier performance against milestones.
- Customer and project supplier review meetings.
- Detailed final reports.



➤ Cable consortium representation

- Represent and promote the customer's investment interests in consortium and private submarine cable infrastructure.
- Submarine cable consortium committee liaison, representation and support (including committee and sub-committee chairmanships) with the objective of protecting and promoting the interests of the customer, to oversee and pursue issues with other administrations as may be requested by the customer.
- Representation in other forums as required by the customer for effective management of submarine interests.
- Liaison with other carrier entities to maximise the mutual benefits — either cost, network resilience or other requirements that may be defined.

➤ Quality assurance

- Supplier audits.
- Design assurance.
- Product acceptance.
- Factory acceptance testing.
- Load monitoring.
- Land cable testing.
- Marine installation representation.
- In-station testing.
- System commissioning.
- Provisional acceptance.
- Final acceptance.

➤ System integration

The system integration service is a process running from system design to final acceptance that delivers a sustainable and documented solution to any submarine system business requirement or technology problem.

This service may be applicable when clients are sourcing different parts of a solution for a submarine system from different vendors and require assurance of system performance and ongoing support for the particular solution. The service runs as an overlay to the basic services delivered for any new system or upgrade and includes some or all of the following elements:

- Project management.
- Design authority.
- Network and system design.
- Solution validation.
- Integration.
- Acceptance.
- Maintenance and technical support.



Operations and maintenance services

From routine inspections to repair and spares management, we provide full support for submarine cable systems.

4

▶ Customer representation

- Monitoring, collecting and representing the customer interests within international committees such as NASCA and ICPC; distribution and distribution of feedback.
- Representing at ACMA or other management agreements, meetings and distribution of feedback.

▶ Central point of contact (Duty engineer 24x7x365)

- Providing a central point of contact contactable on a 24x7x365 basis on all submarine cable system maintenance issues, incidents or events.
- Providing liaison with the customer's international network management teams (e.g. RNMC, Regional NOC and Business Unit Management) during submarine cable incidents or events.

▶ Repair support

Working in conjunction with the cable system landing parties for fault diagnosis and estimation of initial fault localisation:

- Liaison with the marine maintenance contractors (e.g. ACMA) for refining the fault location.
- Operational planning and co-ordination with marine maintenance service providers and third-party network operations centres (NOCs) for implementation of repair.
- Post-repair analysis and review of marine maintenance contractor's repair reports, recovered or expended spare plant.
- Forensic analysis of maintenance service provider billing to ensure billing is consistent with operations reporting.
- Acceptance of refurbished or replenishment of plant.
- Provision of shipboard representation during marine maintenance. Contractor's repair to be agreed and charged separately.

We have installed more than 250 cable systems since 1860. Our leadership in optical transport spans 20 years and more than 100 systems.

➤ Maintenance authority routine activities

- Assessment of proposed cable crossings.
- Cable awareness and protection strategy and practices.
- Management of submarine link test equipment.
- Review of routine fibre loss measurements and submarine cable system measurements and trend analysis.
- Consultancy support on environmental issues (e.g. compliance with landing licence requirements) preparation of method statements for marine support activities.

➤ Shore end inspection

- Management of shore end inspections to provide reports to common standard.
- Management of remedial works to shore ends.
- Management of marine sanctuary liaison.
- Membership continuity on regional cables O&M and AR&R committees to promote the interests of the customer, to maintain oversight, and pursue issues with third-party administrations.

➤ Spares and inventory management

- Co-ordination of spares pooling to minimise depot storage costs.
- Regular review spares pooling opportunities for consortium submarine cable systems to minimise depot storage costs with the objective of making recommendations to appropriate cable O&M subcommittees (O&MSCs)
- Annual testing of spare repeaters.
- Annual testing and assessment of spare cable test results from depots.
- Recommendations for replacement of depleted spare cables.
- Recommendations for replacement depleted joint kits.
- Assessment and qualification management for replacement cable types.
- Assessment and management of local spares levels (e.g. land cable, jointing kits, articulated pipe).

➤ Submarine cable system documentation management

- Compilation and maintenance of system information provided by marine maintenance contractor.
- Maintenance of route position lists (RPLs).
- Maintenance of straight line diagrams (SLDs).
- Maintenance and management of all relevant marine charts.
- List of cable crossings.
- Liaison with the hydrographic office.
- Maintenance authority records including compilation and maintenance of repair history.



Audit and consultancy services

We provide specialist services to evaluate all aspects of operations and engineering, from product assessments to route planning.

5

► Maintenance system appraisal services

SSE can provide tailored audit-based maintenance operational gap analysis services and can provide recommendations on work optimisation, training requirements and cost reduction.

Drawing on its experience as part of one of the world's leading communications providers, SSE can provide O&M standard operating procedures, basic, intermediate and advanced cable system management, and operations and engineering training tailored to individual needs.

► Purchaser design authority

SSE can provide product evaluation services for all submarine system elements for inclusion in submarine system deployments through engineering analysis of the element and evaluation of qualification testing culminating in approval for deployment in submarine systems.

► Marine renewables and energy sector

SSE is able to provide a wide range of expertise to marine renewable energy programmes, including specialist services in respect of route evaluation and optimisation, support to developers in discussions regarding route planning, landfall selection, diversity planning, multi-cable spatial planning, proximity and crossing of existing submarine systems, cable crossings and protection assessments.



Find out more

To learn more about our submarine systems engineering services, visit us at enterprise.vodafone.co.uk/sse or get in touch.



Nigel Fisher

nigel.fisher@vodafone.com

Submarine Systems Engineering Vodafone

Waterside House
Longshot Lane
Bracknell
RG12 1XL
United Kingdom

T: +44 (0) 1344 713 925

M: +44 (0) 7789 394 309

F: +44 (0) 1344 726 767

Stephen Dawe

steve.dawe@vodafone.com

Submarine Systems Engineering Vodafone

32–43 Chart Street
London
N1 6EF
United Kingdom

T: +44 (0) 207 528 2809

M: +44 (0) 779 947 7461

F: +44 (0) 207 528 2811

enterprise.vodafone.com

Vodafone Group 2013. This document is issued by Vodafone in confidence and is not to be reproduced in whole or in part without the prior written permission of Vodafone. Vodafone and the Vodafone logos are trademarks of the Vodafone Group. Other product and company names mentioned herein may be the trademarks of their respective owners. The information contained in this publication is correct at time of going to print. Such information may be subject to change, and services may be modified supplemented or withdrawn by Vodafone without prior notice. All services are subject to terms and conditions, copies of which may be obtained on request.

